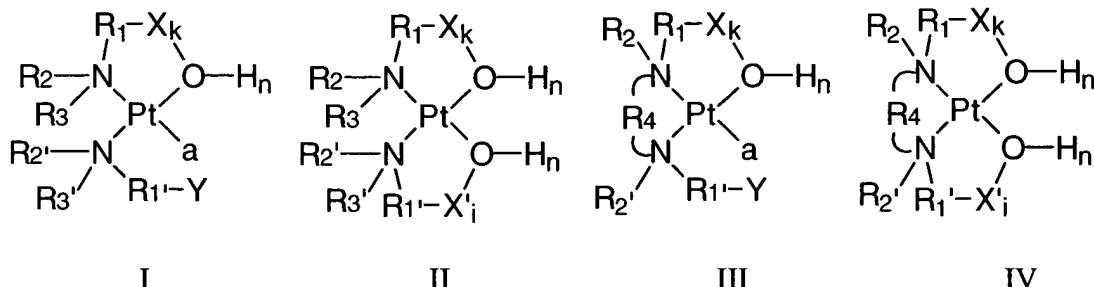


## CLAIMS

I claim:

1. A platinum(II) complex selected from the group consisting of compounds of the general formulae I to IV and physiologically acceptable addition salts of them,

5



wherein the radicals

10  $R^1$  and  $R^{1'}$  are selected independently of one another from the group consisting of substituted or unsubstituted alkylene and alkenylene radicals, which can be substituted by halogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, hydroxy, carboxy, sulphate, phosphate and / or heterocyclic compounds,

15  $R^2$ ,  $R^3$ ,  $R^{2'}$ ,  $R^{3'}$  are selected independently of one another from the group consisting of  $-(CH_2)_m-OH$ ,  $-H$ , substituted or unsubstituted alkyl radicals, saturated and unsaturated cyclic radicals and heterocyclic compounds which can be substituted by halogen, hydroxy, carboxy, sulphate and / or phosphate,

$m$  signifies a natural number from 2 to 5,

20  $R^4$  is selected from the group consisting of substituted or unsubstituted alkylene, alkenylene, cycloalkylene and cycloalkenylene radicals, and aromatic and heterocyclic radicals,

$X, X' = -S(O_2)-$ ,

$k, i = 0$  or  $1$ ,

$Y = -OH, -SO_3H$ ,

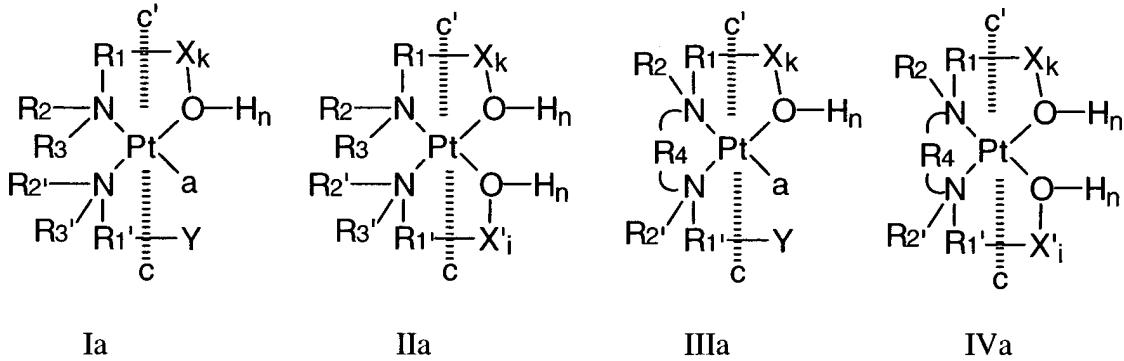
$n = 0$  or  $1$ , and

25  $a$  is selected from the group consisting of halogenides,  $OH^-$ ,  $OH_2$ , carboxylate, sulphate and sulphonate

and mixtures of the compounds for use as prophylactic and / or therapeutic agent for the treatment of diseases.

2. A platinum(IV) complex with a single or double intramolecular cyclization selected from the group consisting of compounds of the general formulae Ia to IVa and physiologically acceptable addition salts of them,

5



wherein the radicals

R<sup>1</sup> and R<sup>1'</sup> are selected independently of one another from the group consisting of  
10 substituted or unsubstituted alkylene and alkenylene radicals, which can be substituted by halogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, hydroxy, carboxy, sulphate, phosphate and / or heterocyclic compounds,

R<sup>2</sup>, R<sup>3</sup>, R<sup>2'</sup>, R<sup>3'</sup> are selected independently of one another from the group consisting of  
- $(CH_2)_m-OH$ , -H, substituted or unsubstituted alkyl radicals, saturated and unsaturated cyclic radicals  
15 or heterocyclic compounds which can be substituted by halogen, hydroxy, carboxy, sulphate and / or phosphate,

m signifies a natural number from 2 to 5,

R<sup>4</sup> is selected from the group consisting of substituted or unsubstituted alkylene, alkenylene, cycloalkylene and cycloalkenylene radicals, and aromatic and heterocyclic radicals,

20 X, X' = -S(O<sub>2</sub>)-,

k, i = 0 or 1,

Y = -OH, -SO<sub>3</sub>H,

n = 0 or 1, and

a, c, c' are selected independently of one another from the group consisting of  
25 halogenides, OH<sup>-</sup>, OH<sub>2</sub>, carboxylate, sulphate and sulphonate

and mixtures of the compounds for use as prophylactic and / or therapeutic agent in the treatment of diseases.

3. The platinum(II) complex according to Claim 1, wherein  
R<sup>2</sup>, R<sup>3</sup>, R<sup>2'</sup>, R<sup>3'</sup> are selected independently of one another from the group consisting of hydrogen, methyl and ethyl radicals.

4. The platinum(II) complex according to claim 1, wherein R<sup>1</sup> and R<sup>1'</sup> are selected  
5 independently of one another from the group consisting of C<sub>2-5</sub>-alkylene radicals and C<sub>2-5</sub>-alkenylene radicals.

5. The platinum(II) complex according to claim 1, wherein R<sup>4</sup> is ethylene.

6. The platinum(II) complex according to claim 1, wherein the radicals have the following significance:

10 R<sup>1</sup>, R<sup>1'</sup> = substituted or non-substituted alkylene,  
k, i = 0, and / or  
Y = -OH.

7. The platinum(II) complex according to claim 1, wherein the radicals have the following significance:

15 R<sup>1</sup>, R<sup>1'</sup> = ethylene,  
k, i = 0,  
Y = -OH, and / or  
n = 0.

8. Use of at least one platinum(II) complex according to claim 1, for the manufacture of  
20 a prophylactic and / or therapeutic agent for the treatment of tumor diseases.

9. A platinum(II) or platinum(IV) compound according to the general formula (V),



wherein

25 n is equal to 0 or 1,

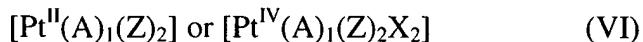
A, X are selected independently of one another from the group consisting of halogenides, OH<sup>-</sup>, carboxylate, sulphate and sulphonate, and

30 Z is selected from the group consisting of hydroxyalkyl amine, hydroxyalkenyl amine, sulphaalkyl amine, sulphaalkenyl amine, which is substituted at at least one of the CH<sub>2</sub>- or CH groups by a halogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, hydroxyl, carboxyl, sulphate,

phosphate radical and / or a heterocyclic compound and additionally the amino nitrogen can be substituted with these radicals, wherein

for n equal to 0, the two radicals Z present in the molecule can be linked via a radical selected from the group consisting of substituted or unsubstituted alkylene, alkenylene, cycloalkylene and cycloalkenylene radicals and a heterocyclic compound, preferably ethane-1,2-diy1 and their physiologically acceptable addition salts.

10. A platinum(II) or platinum(IV) compound according to the general formula (VI),



wherein

A and X are selected independently of one another from the group consisting of halogenides,  $OH^-$ ,  $OH_2$ , carboxylate, sulphate and sulphonate, and

15 Z is selected from the group consisting of hydroxyalkyl amine, hydroxyalkenyl amine, carboxyalkyl amine, carboxyalkenyl amine, sulphaalkyl amine and sulphaalkenyl amine, which is substituted at at least one of the  $CH_2$ - or CH groups by a halogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, hydroxyl, carboxyl, sulphate, phosphate radical and / or a heterocyclic compound and additionally can be substituted at the amino nitrogen by these radicals,

20 wherein

the two Z radicals present in the molecule can be linked via a radical selected from the group consisting of alkylene, alkenylene, cycloalkylene and cycloalkenylene and a heterocyclic compound, or substituted alkylene, alkenylene, cycloalkylene and cycloalkenylene

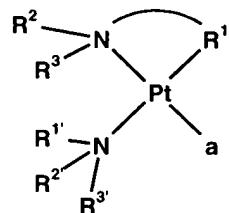
25 and their physiologically acceptable addition salts.

11. The compound according to claim 10, wherein two radicals Z present in the molecule are linked via ethylene.

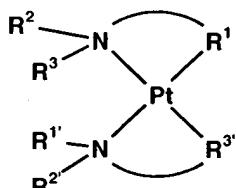
12. The platinum(II) and / or platinum(IV) compound according to claim 9, for use as a prophylactic and / or therapeutic agent for the treatment of diseases.

13. Use of at least one platinum(II) and / or platinum(IV) compound according to claim 9, for the manufacture of a prophylactic and / or therapeutic agent for the treatment of tumor diseases.

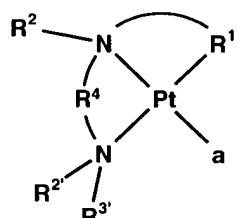
14. Use of platinum(II) a complex of the general formulae Ib to IVb for the manufacture of medicaments for the therapy of tumor diseases,



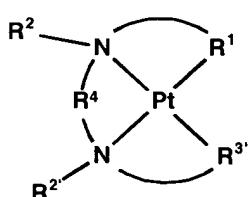
Ib



IIb



IIIb



IVb

wherein the radicals

10  $R^1$  and  $R^{3'}$  originate from the group of hydroxyalkyls and hydroxyalkenyls and hydroxyalkyls and hydroxyalkenyls substituted with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate, wherein the hydroxyalkyls and hydroxyalkenyls can be present protonated or deprotonated,

$R^2, R^3, R^{1'}, R^{2'} = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -$

15  $CH_2-CH_2-CH_2-CH_2-OH, -H$ , methyl, ethyl, saturated or unsaturated cyclic radicals, also heterocyclic compounds, as well as their halogen, hydroxy, carboxy, sulphate or phosphate derivatives,

$R^4 =$  alkyl, alkylene, cycloalkyl, cycloalkene, heterocyclic radicals or substituted alkyls and alkylanes, cycloalkyl and cycloalkene, but preferably can be ethane-1,2-diyi,

20 and a belongs to the group of halogenides (fluorine, chlorine, bromine, iodine),  $OH^-$ ,  $OH_2$ , carboxylate, sulphate or sulphonate.

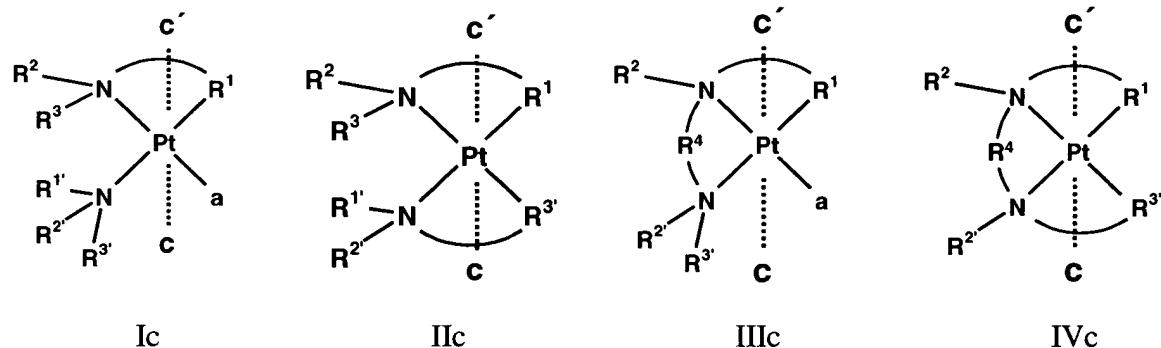
15. Use of a compound according to claim 14, wherein however  $R^1$  and  $R^{3'}$  = carboxy alkyls or carboxy alkenyls as well as carboxy alkyls and carboxy alkenyls substituted by halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and the carboxy alkyls or carboxy alkenyls can be present protonated or deprotonated.

5 16. Use of a compound according to claim 14, wherein however  $R^1$  and  $R^{3'}$  = sulphaalkyls or sulphaalkenyls as well as sulphaalkyls and sulphaalkenyls substituted by halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and the sulphaalkyls or sulphaalkenyls can be present protonated or deprotonated.

17. Use of a compound according to claim 14, wherein in particular

10  $R^1$  and  $R^{3'}$  =  $-\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$  and  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$  and  
15  $R^1$  and  $R^{3'}$  =  $-\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ ,  $-\text{CH}_2\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ ,  $-\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$ ,  $-\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$  and  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{SO}_3\text{H}$  can be present protonated or deprotonated.

18. Use of a platinum(IV) complex with single or double intramolecular cyclizations of the general formulae Ic to IVc for the manufacture of medicaments for the therapy of tumor diseases,



20 wherein the radicals  
25  $R^1$  and  $R^{3'}$  originate from the group of hydroxyalkyls and hydroxyalkenyls, and hydroxyalkyls and hydroxyalkenyls substituted with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate, wherein the hydroxyalkyls and hydroxyalkenyls can be present protonated or deprotonated,

$R^2, R^3, R^1, R^2' = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-CH_2-OH, -H$ , methyl, ethyl, saturated or unsaturated cyclic radicals, also heterocyclic compounds, as well as their halogen, hydroxy, carboxy, sulphate or phosphate derivatives,

5  $R^4 =$  alkyl, alkylene, cycloalkyl, cycloalkene, heterocyclic radicals or substituted alkyls and alkylenes, cycloalkyl and cycloalkene, but can preferably be ethane-1,2-diyl, and a and c belong to the group of halogenides (fluorine, chlorine, bromine, iodine),  $OH^-$ ,  $OH_2$ , carboxylate, sulphate or sulphonate.

19. Use of a compound according to Claim 18, wherein however  $R^1$  and  $R^3' =$  carboxy alkyls or carboxy alkenyls as well as carboxy alkyls and carboxy alkenyls substituted with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and the carboxy alkyls or carboxy alkenyls can be present protonated or deprotonated.

20. Use of a compound according to claim 18, wherein however  $R^1$  and  $R^3' =$  sulphaalkyls or sulphaalkenyls as well as sulphaalkyls and sulphaalkenyls substituted with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and the sulphaalkyls or sulphaalkenyls can be present protonated or deprotonated.

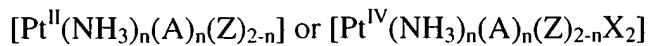
21. Use of a compound according to claim 18, in particular

$R^1$  and  $R^3' = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -CH_2-$   
20  $CH_2-CH_2-CH_2-CH_2-OH, -CH_2-COOH, -CH_2-CH_2-COOH, -CH_2-CH_2-CH_2-COOH, -CH_2-CH_2-$   
 $SO_3H, -CH_2-CH_2-CH_2-SO_3H, -CH_2-CH_2-CH_2-CH_2-SO_3H$  and  $-CH_2-CH_2-CH_2-CH_2-CH_2-SO_3H$  and  
 $R^1$  and  $R^3' = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-$   
 $CH_2-OH, -CH_2-COOH, -CH_2-CH_2-COOH, -CH_2-CH_2-CH_2-COOH, -CH_2-CH_2-SO_3H, -CH_2-CH_2-$   
 $CH_2-SO_3H, -CH_2-CH_2-CH_2-CH_2-SO_3H$  and  $-CH_2-CH_2-CH_2-CH_2-SO_3H$  can be present  
25 protonated and deprotonated.

22. Use of a platinum compound according to claims 14, wherein however the radicals  $R^1$  and  $R^3'$  preferably signify substituted and non-substituted hydroxyalkyls and wherein the hydroxyalkyls can be protonated or deprotonated.

23. Use of a platinum compound according to claim 14, wherein however the radicals  $R^1$  and  $R^3'$  preferably signify 2-hydroxyethyl or deprotonated 2-hydroxyethyl, but especially preferably deprotonated 2-hydroxyethyl in the cyclized form.

24. A platinum(II) or platinum(IV) compound according to the general formula



5                   wherein

n is equal to 0 or 1,

A and X belong to the group of halogenides (fluorine, chlorine, bromine, iodine),

$\text{OH}^-$ ,  $\text{OH}_2$ , carboxylate, sulphate or sulphonate,

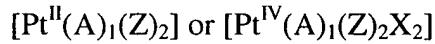
and Z,

10                   provided n is equal to 0, the two radicals Z present in the molecule can be linked via a radical from the group of alkyls, alkylanes, cycloalkyls, cycloalkenyls, heterocyclic compounds or substituted alkyls and alkylanes, cycloalkyls and cycloalkenyls, but preferably ethane-1,2-diyl,

represents a hydroxyalkyl amine or hydroxyalkylene amine, carboxyalkyl amine or carboxyalkylene amine or sulphaalkyl amine or sulphaalkylene amine, which is derivatized on at

15                   least one of the  $\text{CH}_2$  or CH groups with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and additionally can be derivatized on the amino nitrogen with these groups.

25. A platinum(II) or platinum(IV) compound according to the general formula



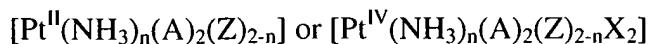
20                   wherein

A and X belong to the group of halogenides (fluorine, chlorine, bromine, iodine),

$\text{OH}^-$ ,  $\text{OH}_2$ , carboxylate, sulphate or sulphonate, and

25                   Z represents a hydroxyalkyl amine or hydroxyalkylene amine, carboxyalkyl amine or carboxyalkylene amine or sulphaalkyl amine or sulphaalkylene amine, which is derivatized on at least one of the  $\text{CH}_2$  or CH groups with halogens, alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and additionally can be derivatized on the amino nitrogen with these groups, wherein two radicals Z present in the molecule 30 can be linked via a radical from the group of alkyls, alkylanes, cycloalkyls, cycloalkenyls, heterocyclic compounds or substituted alkyls and alkylanes, cycloalkyls and cycloalkenyls, but preferably ethane-1,2-diyl.

26. A platinum(II) or platinum(IV) compounds according to the general formula

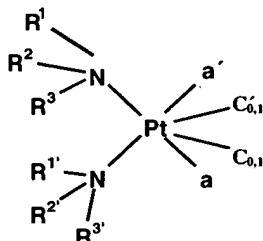


5 wherein  
n is equal to 0 or 1,  
A and X belong to the group of halogenides (fluorine, chlorine, bromine, iodine),  
OH<sup>-</sup>, OH<sub>2</sub>, carboxylate, sulphate or sulphonate,  
and Z,

10 provided n is equal to 0, the two radicals Z present in the molecule can be linked via  
a radical from the group of alkyls, alkynes, cycloalkyls, cycloalkenyls, heterocyclic compounds or  
substituted alkyls and alkynes, cycloalkyls, cycloalkenyls, but preferably ethane-1,2 diyl,  
15 represents a hydroxyalkyl amine or hydroxyalkylene amine, carboxyalkyl amine or  
carboxyalkylene amine or sulphonyl amine or sulphonylalkylene amine, which is derivatized on at  
least one of the CH<sub>2</sub> or CH groups with halogens, alkyls, cycloalkyls, heterocyclic compounds or  
functional groups such as hydroxy, carboxy, sulphate or phosphate and additionally can be  
derivatized on the amino nitrogen with these groups.

27. Use of a substance according to claim 24, for the manufacture of medicaments for the  
treatment of tumor diseases.

20 28. Use of a platinum(II) or platinum(IV) complex of the general formula V for the  
manufacture of medicaments for the therapy of tumor diseases



V

25 wherein the radicals R<sup>1</sup> and R<sup>3</sup> originate from the group of hydroxyalkyls and  
hydroxyalkenyls and hydroxyalkyls and hydroxyalkenyls substituted with halogens, alkyls,

cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate, wherein the hydroxyalkyls and hydroxyalkenyls can be present protonated or deprotonated,

$R^2, R^3, R^{1'}, R^{2'} = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -$

5  $CH_2-CH_2-CH_2-CH_2-CH_2-OH, -H$ , methyl, ethyl, saturated or unsaturated cyclic radicals, also heterocyclic compounds, as well as their halogen, hydroxy, carboxy, sulphate or phosphate derivatives,

$R^4 =$  alkyl, alkylene, cycloalkyl, cycloalkene, heterocyclic radicals or substituted alkyls and alkylenes, cycloalkyl and cycloalkene, but preferably ethane-1,2-diy1,

10 and a, a' and c, c' belong to the group of halogenides (fluorine, chlorine, bromine, iodine),  $OH^-$ ,  $OH_2$ , carboxylate, sulphate or sulphonate, wherein for platinum(II) compounds c is omitted (c0).

29. Use of a compound according to claim 28, wherein however  $R^1$  and  $R^{3'} =$  carboxy alkyls or carboxy alkenyls as well as carboxy alkyls and carboxy alkenyls substituted with halogens, 15 alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and wherein the carboxy alkyls and carboxy alkenyls can be present protonated or deprotonated.

30. Use of a compound according to claim 28, wherein however  $R^1$  and  $R^{3'} =$  sulphaalkyls or sulphaalkenyls as well as sulphaalkyls and sulphaalkenyls substituted by halogens, 20 alkyls, cycloalkyls, heterocyclic compounds or functional groups such as hydroxy, carboxy, sulphate or phosphate and the sulphaalkyls or sulphaalkenyls can be present protonated or deprotonated.

31. Use of a compound according to claim 28, in particular

$R^1$  and  $R^{3'} = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -CH_2-$

25  $CH_2-CH_2-CH_2-CH_2-OH, -CH_2-COOH, -CH_2-CH_2-COOH, -CH_2-CH_2-CH_2-COOH, -CH_2-CH_2-$   
 $SO_3H, -CH_2-CH_2-CH_2-SO_3H, -CH_2-CH_2-CH_2-CH_2-SO_3H$  and  $-CH_2-CH_2-CH_2-CH_2-CH_2-SO_3H$  and  
 $R^1$  and  $R^{3'} = -CH_2-CH_2-OH, -CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-OH, -CH_2-CH_2-CH_2-CH_2-$   
 $CH_2-OH, -CH_2-COOH, -CH_2-CH_2-COOH, -CH_2-CH_2-CH_2-COOH, -CH_2-CH_2-SO_3H, -CH_2-CH_2-$   
 $CH_2-SO_3H, -CH_2-CH_2-CH_2-CH_2-SO_3H$  and  $-CH_2-CH_2-CH_2-CH_2-SO_3H$  can be present  
protonated or deprotonated.

32. Use of a platinum compound according to claim 28, wherein however the radicals R<sup>1</sup> and R<sup>3'</sup> preferably signify substituted and non-substituted hydroxalkyls and wherein the hydroxalkyls can be present protonated or deprotonated.

5 33. Use of a platinum compound according to claim 28, wherein however the radicals R<sup>1</sup> and R<sup>3'</sup> preferably signify 2-hydroxyethyl or deprotonated 2-hydroxyethyl, but especially preferably deprotonated 2-hydroxyethyl in the cyclized form.

34. A medicament containing a compound of claim 14.